development, the growth of the gametophytes, pollination and fertilization. Pollination is largely dependent upon the surface film of water. The functionless pollen tubes swell up into 'cystoids' in the ovarian cavity. These enlargements contain the male structures, still showing themselves as distinct cells instead of nuclei only. Double fertilization occurs and the oospore divides before the endosperm nucleus.—A paper on the 'Chemotropism of Roots,' by F. C. Newcombe and Anna L. Rhodes, records *Lupinus albus* roots as positively chemotropic toward disodium phosphate, no concentration of the salt producing a negative curve. Roots will bend into a solution strong enough to kill them. There is no evidence of osmotropism. Roots of *Cucurbita pepo* exhibit a general indifference to chemicals, showing no chemotropism even toward disodium phosphate.—'A Botanical Survey of the Huron River Valley,' by L. H. Weld, forms a second contribution to the botanical survey of this region undertaken under the direction of Professor Spalding. The paper gives detailed accounts of the soil and vegetation. The author's plan has been to give exact data, so that a comparative study may be made in the future by himself or others. Vegetation is considered largely from the dynamic standpoint.—'Southwestern Plants,' by L. N. Goodding, is a paper describing a number of new species, chiefly from southern Nevada and Utah.—W. C. Coker publishes a series of figures of the sprouting spores of *Equisetum*, showing great variation, and also describes spore distribution in liverworts.—J. B. Farmer explains his views of the quadripolar spindle in the Hepaticæ, in view of the fact that several late papers seemed to attack it.

The contents of *The Journal of Comparative Neurology* for December are as follows:

O. P. Jenkins and A. J. Carlson: 'The Rate of the Nervous Impulse in the Ventral Nerve-Cord of Certain Worms.'

O. S. Strong: 'Notes on the Technique of Weigert's Method for Staining Medullated Nerve Fibers.'

C. Judson Herrick: 'The Doctrine of Nerve Components and some of its Applications.'

B. F. Kingsbury: 'Columella Auris and Nervus Facialis in the Urodela.'

Editorials and reviews.

A monthly journal for teachers of mathematics, entitled 'School Mathematics,' edited by Messrs. George W. Myers and C. E. Lineberger has begun publication. It is a continuation of the mathematical supplement of 'School Science.'

Dr. Toulouse has become editor of the *Revue Scientifique*, the French weekly journal whose scope most nearly corresponds with that of *Nature* and of Science. Dr. Toulouse is director of the laboratory of experimental psychology at the Paris Ecole des Hautes Etudes and editor of the 'International Library of Experimental Psychology,' now being published in fifty volumes.

It is said that there will shortly be published at Paris a monthly journal devoted to radium and called *Le radium*.

SOCIETIES AND ACADEMIES.

THE GEOLOGICAL SOCIETY OF WASHINGTON.

The 149th meeting was held on January 13, 1904. The following papers were presented in the regular program.

The Work of the Strassburg Seismological Congress: H. F. Reid.

Professor Reid, who was the official delegate from the United States, stated that the congress was held in response to a call from the German government to discuss the organization of an international seismological association. The congress was attended by official delegates from nineteen countries, and two others were unofficially represented.

The conference resulted in the determination of the form of an international seismological association, which will be submitted to all civilized nations of the world by the German government. The most important clauses of the constitution are as follows:

"The object of the association is the study of seismological problems, whose solution is only possible by the cooperation of many observatories in all parts of the world. The principal means of attaining this object are: (*a*) Observations according to common principles; (*b*) experiments on problems of special importance; (*c*) foundation and support of

seismological observatories in countries which need the pecuniary aid of the association; (*d*) organization of a central bureau for the collection, study, editing and publication of the reports sent from various countries.

"The members of the association shall be the nations which may join. They are to make the following annual contributions through the department of state at Berlin: (*a*) Nations with a population of less than five million, $100; (*b*) nations with a population between five and ten million, $200; (*c*) nations with a population between ten and twenty millions, $400; (*d*) nations with a population of more than twenty million, $800.

"The organs of the association are: (*a*) The general assembly; (*b*) the permanent commission; and (*c*) the central bureau.

"The general assembly shall consist of delegates from the nations which are members of the association, and is to meet at least once in four years. Delegates from scientific societies and other persons may be invited to attend the general assembly.

"The permanent commission shall consist of the director of the central bureau and one delegate from each nation.

"It shall elect from its own number its president, vice-president and secretary-general.

"The permanent commission shall have general control of the affairs of the association, and shall see that the resolutions of the general assembly are carried out. It shall also direct the method of expenditure of the funds of the association, which are to be used for: (*a*) Expenses of publication and administration; (*b*) salary of the secretary-general; (*c*) to subsidize theoretical work or experiments of exceptional importance which may have been ordered by the general assembly; (*d*) for the foundation and support of seismological observatories founded by the association, the observations of which are of general interest for the study of seismical phenomena.

"A financial account shall be published in the proceedings of the permanent commission.

"The central bureau shall be located at the imperial central seismological station at Strassburg, and the director of the latter shall be the director of the central bureau; the central bureau shall have the benefit of the assistants and resources of the central station.

"The central bureau shall collect the reports from the different countries, edit and publish them. The director of the central bureau shall present an annual report covering the whole work of the bureau, and shall also outline the work proposed for the following year.

"The secretary-general shall make a report to every general assembly on the work and condition of the association. He shall attend to the publication of the proceedings of the permanent commission, of the deliberations of the general assembly and of investigations undertaken by order of the association. He shall have charge of the general affairs of the association under the direction of the president of the permanent commission.

"The association shall be formed for a period of twelve years, beginning April 1, 1904. Nations which join the association may withdraw at the end of each period of four years, on giving six months' notice of their intention."

The next paper, entitled 'Experiments on the Pollution of Deep Wells in Georgia,' presented by Mr. M. L. Fuller, dealt with a practical experiment, conducted by the United States Geological Survey and the Geological Survey of Georgia, acting in cooperation, to determine the liability of contamination of the deep wells and springs in the vicinity of Quitman, Georgia, by the proposed action of that city in turning the public sewage into an underground stream through a bore hole. To test the matter the surveys mentioned inserted two tons of salt into the well into which it was proposed to turn the sewage. Samples of water were taken before the experiment to determine the normal chlorine of the waters, and at short intervals during and for some time after the experiment. On analyzing the samples it was shown that the salt had entered all of the deep wells in town, thereby demonstrating that the insertion of sewage would have contaminated all of the wells and possibly led to a dangerous epidemic.

Mr. Arthur J. Collier then presented a paper on 'The Tin Deposits of the York Region, Alaska.'

The York region occupies the western part of the Seward Peninsula, and has the form of a triangle, with Cape Prince of Wales, the most western point of the continent, at the apex, the Arctic Ocean and Bering Sea for the sides. The region has no harbor, and landings are made through the surf, but Port Clarence, a safe, deep harbor, lies twenty-five miles southeast.

The principal topographic features are the York Mountains, which occupy the southeast corner of the triangle, and the York Plateau, 200 to 600 feet high, surrounding these mountains on the south, west and north sides. Cape Mountain and Cone Hill are 'monadnocks' on this plateau, the former marking the westernmost point of land. Three sedimentary formations are recognized, forming irregular belts, which extend north and south. The York Mountains are composed of Silurian limestones. West of these is a belt of metamorphic slates of undetermined age, and beyond these is a narrow limestone belt probably of lower Carboniferous age. These sediments contain intrusive masses of granite and rhyolite, with which tin ore is associated, and greenstones which have no economic bearing.

The Lost River tin deposits are four or five miles from the coast in the York Mountains. The tin occurs in a greisen dike, about one mile long and 100 feet wide, which cuts the limestone and extends east and west. The rock consists of fluorite, calcite, quartz and lithia mica, with cassiterite, pyrite, galena, wolframite and garnet as accessory minerals. In a granite boss, south of this dike, some stannite was found.

On Cape Mountain, which is an intrusive granite boss, cassiterite, closely associated with tourmaline, has been found on the surface, at at least three distinct points. During the past year several short tunnels were driven into the mountain in search of the veins from which it was derived, but so far without success, though the granite is partially altered to greisen, and possibly carries small amounts of tin.

On Buck Creek, which lies twenty miles inland and drains into the Arctic Ocean, the ore occurs in the form of stream-tin. The alluvial deposits were exploited during the past season, and a number of tons of tin ore were mined and shipped. The stream-tin evidently came from small veins in the slates. No veins of this kind have been found in place, but specimens, showing their character, have been found in the gravels.

The placers on the Anikovik River and Buhner Creek, in which tin ore was found in 1900, have been abandoned, but all of the discoveries and developments noted date from that report.

Alfred H. Brooks,
Secretary.

The Chemical Society of Washington.

The 147th regular and the 20th annual meeting of the society was held on January 14 in the Assembly Hall of the Cosmos Club.

The annual reports of the treasurer and secretary were read and the following officers elected:

President—Dr. E. T. Allen.
First Vice-President—Mr. S. S. Voorhees.
Second Vice-President—Mr. L. M. Tolman.
Secretary—Mr. Atherton Seidell.
Treasurer—Mr. F. P. Dewey.
Additional members of the executive committee—Dr. W. T. Hillebrand, Mr. L. S. Munson, Dr. E. A. Hill and Mr. Allen Wade Dow.
Nominated to represent the Chemical Society as Vice-President in the Washington Academy of Sciences—Dr. Frank W. Clarke.
Representatives in the Council of the American Chemical Society, elected November, 1903—Dr. Henry N. Stokes, Mr. S. S. Voorhees.

A special meeting of the society was held at 8 P.M., February 1, in the Chemical Lecture Hall of the Columbian University, to hear an address by Dr. Chas. B. Dudley, of Altoona, Pa., upon the 'Work of a Chemist on a Railroad.'

The speaker first briefly presented statistics of the equipment and annual expenditures of the Pennsylvania Railroad system. It appeared that up to the time of the establishment of the chemical laboratory of that railroad the supplies were bought solely upon the representation and reputation of dealers or manufacturers, but the work of the chemist has shown the necessity for critically examining all materials bought for the road.

The work of a railroad chemist divides itself into three main divisions, which are: (1) Experimental investigations to ascertain the requirements of the railroad, respecting different classes of supplies, and from such investigations the preparation of written specifications describing such requirements. The importance of this work for the future good to the road was emphasized. (2) The testing of supplies to learn if the quality of the material corresponds with that provided for by the specifications. (3) Difficulties or problems which other officers of the road, from lack either of time or of proper training, are unable to solve. A number of examples of such difficulties which came within his experience were described. The speaker concluded by assuring the young men present that the number of problems for the railroad chemist to solve was greater now than ever, and this field of work still offers very important opportunities for usefulness.

A. SEIDELL,
Secretary.

MASSACHUSETTS INSTITUTE OF TECHNOLOGY GEOLOGICAL JOURNAL CLUB.

THE club reviewed the following articles during December and the first two weeks in January:

L. T. Buell, 'The Tin Deposits of the Malay Peninsula' (*Jour. Geol.,* February-March, 1903); H. A. Buff, 'Conditions in the Pennsylvania Anthracite Region' (*Eng. and Min. Jour.,* November 28, 1903); P. M. Paine, 'The Laurentian Peneplain' (*Jour. Geol.,* October–November, 1903); J. T. Glidden, 'Lead Resources of the United States' (*Eng. and Min. Jour.,* November 28, 1903); B. L. Johnson, 'Some Montana Coal Fields' (*Am. Geologist,* December, 1903); W. L. Spalding, 'The Ore Deposits of Tonopah, Nevada' (*Eng. and Min. Jour.,* November 21, 1903); W. L. Whittemore, 'Cobalt Mining in New Caledonia' (*Eng. and Min. Jour.,* November 28, 1903); R. H. Allen, 'Gold Mining in Rhodesia' (*Eng. and Min. Jour.,* December, 10, 1903); C. H. Clapp, 'The Wisconsin Zinc Fields' (*Eng. and Min. Jour.,* December 5, 1903); W. G. Ball, 'The Quicksilver Mines in Idria' (*Eng. and Min. Jour.,* December 17, 1903); C. E. Danforth, 'Asphalt Mining and Refining in the Indian Territory' (*Eng. and Min. Jour.,* December 17, 1903); C. W. Johnston, 'The Gold Placers of Bokhara' (*Eng. and Min. Jour.,* December 24, 1903); E. Burton, 'Age of Gypsum of Central Iowa' (*Jour. Geol.,* November–December); F. S. Elliot, 'Geology of the Apache Cañon Placers' (*Eng. and Min. Jour.,* December 24, 1903); M. Rubel, 'The Anthracite Conciliation Board' (*Eng. and Min. Jour.,* December 24 and 31, 1903).

The following original papers were read:

Professor W. O. Crosby, 'The Physiographic Geology of the Gold Regions of Alaska.' The paper was illustrated by several lantern views which were taken by Professor Crosby on his recent trip through Alaska. Professor W. H. Niles, 'The Life of Joseph Le Conte'; Professor A. W. Grabau, 'Rock Classification.' Professor Grabau presented a new system of classification which should include all the different kinds of rocks. His paper was discussed with very great interest and met with general approval. G. F. Loughlin described a granite-gneiss of central Connecticut. The igneous origin of this formation was proved by Mr. Lewis Westgate (*Jour. Geol.,* Vol. VII., No. 7, October, 1899). Mr. Loughlin reviewed Mr. Westgate's paper, and spoke of the fitness of the stone for building purposes. He attributed the tendency of the stone to stain on exposure to the minute grains of pyrite and microscopic garnets which are abundant in the rock. J. Daniels spoke briefly on the methods of taking sample borings and the uses made of them.

G. F. LOUGHLIN,
Secretary.

NEW YORK ACADEMY OF SCIENCES. SECTION OF BIOLOGY.

THE January meeting was held on the eleventh of the month, Professor Underwood presiding. Papers were read by Professor H. F. Osborn and Miss Adele M. Fielde.

Professor Osborn's paper, entitled 'The Classification of the Reptilia,' presented the history of the classification as follows: (1) Recognition of the Cotylosauria as the most

primitive group of reptiles, by Cope and Baur. (2) The separation of the Anomodontia, Chelonia and Sauropterygia as reptiles with a single temporal arcade, by Smith Woodward and Broom. (3) The affiliation of the Ichthyosaur with the two-arched rather than single-arched reptiles, by Baur and McGregor. (4) The recognition of *Sphenodon* as the ancestral type of the two-arched reptiles, by Baur and others. (5) Separation of the reptiles into two great groups of single-arched and two-arched types, by Smith Woodward and Broom. (6) The demonstration that reptiles are separated not only by the structure of the temporal arch but by many fundamental characters into two distinct groups, by Osborn and McGregor (1902). (7) Consequent division of the Reptilia into two subclasses Synapsida and Diapsida, by Osborn (1903). (8) The proposal of the Diaptosauria to include all of the most primitive two-arched reptiles without armature, by Osborn (1903). (9) The classification of the Reptilia according to the accompanying table (1903–4).

CLASS REPTILIA.

I. Subclass SYNAPSIDA, Osborn.
  1. Order COTYLOSAURIA, Cope [= Pareiasauria, Seeley].
    Family Diadectidæ.
    Family Pariotichidæ.
    Family Pareiasauridæ.
  2. Superorder ANOMODONTIA, Owen [= Theromorpha, Cope, in part].
    Order I. THERIODONTIA, Owen.
      Suborder I. Therocephalia.
      Suborder II. Cynodontia, Owen.
    Order II. DICYNODONTIA, Owen.
      Inc. Sedis.
    Order III. PLACODONTIA, Owen.
  3. Order SAUROPTERYGIA.
    Suborder I. Simosauria, Gervais [= Nothosauria].
    Suborder II. Plesiosauria.
  4. Order TESTUDINATA.
    Suborder I. Pleurodira.
    Suborder II. Cryptodira.
    Suborder III. Trionychia.

II. Subclass DIAPSIDA, Osborn.
  1. Superorder DIAPTOSAURIA, Osborn.
    Order I. PROCOLOPHONIA, Seeley
    Order II. PROTOROSAURIA, Seeley.
    Order III. PROGANOSAURIA, Baur.
    Order IV. GNATHODONTIA, Owen.
    Order V. PELYCOSAURIA, Cope.
    Order VI. CHORISTODERA, Cope.
    Order VII. RHYNCHOCEPHALIA, Günther.
  2. Order PARASUCHIA, Huxley.
    Suborder I. Aëtosauria.
    Suborder II. Phytosauria.
  3. Order ICHTHYOSAURIA, Blainville, 1835 [= Ichthyopterygia, Owen, 1839].
  4. Order CROCODILIA.
    Suborder I. Mesosuchia.
    Suborder II. Eusuchia.
    Suborder III. Thalattosuchia.
  5. Superorder DINOSAURIA, Owen.
    Order I. THEROPODA, Marsh.
      Suborder I. Megalosauria [= Thecodontia, Owen].
      Suborder II. Compsognatha, Huxley.
    Order II. OPISTHOCŒLIA, Owen [= Sauropoda, Marsh].
    Order III. ORNITHOPODA, Cope [= Predentata, Marsh].
  6. Superorder SQUAMATA.
    Order I. LACERTILIA.
    Order II. MOSASAURIA.
    Order III. OPHIDIA.
  7. Order PTEROSAURIA.

Miss Fielde's paper, on the 'Sense of Smell in Ants,' described her experiments with many species of these insects. Each species appears to have its distinctive odor, discernible by other ants. Within each species there are also differences of odor, dependent on the age of the colony and the age of the queen from whose eggs its inmates are produced. The ant's organs of smell are its antennæ, in which the joints are as a series of noses, each having a special function. The distal joint appreciates the nest-aura informing the ant whether it is in its own nest or in that of an enemy. The second joint discriminates between the odors of ants of the same species as itself, but of different colonies. The third joint discerns the scent of the track laid down by the ant's own feet, and enables the ant to return upon any route that has been previously traversed. The fourth and fifth joints smell the larvæ and pupæ, and the removal of these joints disables the ant from further care of the inert young. The sixth and seventh joints make known to the ant the presence of

ants of other species than her own. So many as five joints may be retained by ants whose antennæ have normally eleven or twelve joints, and these ants will live peacefully together though they be of different subfamilies. But if seven joints be retained, the ants, similarly grouped, will fight one another to the death. If ants make one another's acquaintance before they are twelve hours old they will thereafter live amicably together although they be of different species, genera or even of different subfamilies. But in three days after hatching their criterion of correct ant odor is established, and they refuse to affiliate with ants whose odor is not in accord with their standard.

M. A. BIGELOW,
Secretary.

THE TORREY BOTANICAL CLUB.

THE Torrey Botanical Club met at the New York Botanical Garden, January 27.

The first paper on the scientific program was by Dr. J. K. Small, on 'Recent Explorations in Southern Florida.' Dr. Small was accompanied on his trip by J. J. Carter, of Pennsylvania, and for a part of the time by A. A. Eaton, who paid special attention to the orchids and ferns. From Miami as a base expeditions were made in different directions. One trip was made to the northward in the direction of Ft. Worth. Four strikingly different plant formations were noted in this region: (1) Sand ridges covered with gnarled and stunted trees and shrubs mixed with cactuses with almost no grass or herbaceous vegetation, (2) low-lying moist lands covered with grass and sedges but destitute of trees and shrubs, (3) the pine lands, and (4) the hummocks filled with broad-leaved evergreens and deciduous trees. The country south of Miami is just being opened up to settlement and is still in a primitive condition. Most of the excursions were in this direction, explorations being made for a distance of forty-five miles. The region consists of low coral-limestone ridges with no appreciable soil, but still supporting a dense pine forest. The lower levels are filled with water and constitute arms of the everglades. The pine lands are interspersed with occasional small hummocks. An exceedingly interesting flora was found, and over a thousand numbers were collected, which include an unusual number of new and interesting things. So far as the collections have been studied, the plants from the hummocks show a close relationship to the Cuban flora and include a considerable number of West Indian species not heretofore known from the mainland. The pine-land plants, on the contrary, are largely endemic and include many undescribed species.

In the discussion which followed the reading of the paper it was stated that the expedition would probably add at least a hundred species to the known flora of the United States.

The second paper was by Dr. J. C. Arthur, on 'An Interesting Unpublished Work on the Fungi.' The paper will be printed in an early issue of *Torreya.*

The third paper was by Dr. N. L. Britton, on 'The Birch Trees of North America.' Recent study in arranging the dendrological exhibit in the museum has shown the necessity for a further investigation of our arborescent flora. In some genera, notably in *Fraxinus,* too many species are now recognized and some reductions will be necessary. In the birches, on the contrary, it is necessary to recognize at least four new species. One of these is in the Alleghany region, and the others are northwestern.

F. S. EARLE,
Recording Secretary.

DISCUSSION AND CORRESPONDENCE.

CONVOCATION WEEK.

THE problem of cooperation and practical affiliation between the important scientific societies of the country and the American Association is one which, admittedly, is becoming each year more difficult of solution. The difficulty, moreover, is multiple and dependent on a variety of factors, rather than on one or two.

The consideration of expense, dependent partly on distance, is usually urged as the most important one, but this plea is not always sufficient. During the last convocation week it is known that many men in going to